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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,812	12/11/2003	Peter A. Jardine	P/4242-6	2786

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OSTROLENK FABER GERB & SOFFEN  
1180 AVENUE OF THE AMERICAS  
NEW YORK, NY 100368403

EXAMINER
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ZIMMERMAN, JOHN J

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/734,812	JARDINE, PETER A.	
	<b>Examiner</b>	<b>Art Unit</b>	
	John J. Zimmerman	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 18-20 is/are rejected.
- 7) ☒ Claim(s) 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## FIRST OFFICE ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities: The status of the parent application should be updated in paragraph [0001] of the specification. Appropriate correction is requested.

### *Double Patenting*

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 15-16 and 18 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 9-10 of U.S. Patent No. 6,689,486.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the coverage of the claims of the pending application encompass the nickel and titanium

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materials required in the claims of the patent. Since shape memory alloys comprising nickel and titanium are among the most common shape memory alloys available, nickel and titanium memory alloys are clearly obvious materials to use for pending claims 15-18. In addition, as evidenced by claim 10 of the patent, three-dimensional shapes for the actuator are clearly covered by the claims of the patent. In addition, the intended use "for active flow control" of the claims of the patent do not add any physical limitations that would not be present in claims 15-18 of this pending application. Regarding the limitations of claims 16-18 of the pending application, these embodiments fall within the scope of the claims of the patent and in view of the fact that the claims of the patent recite use as an actuator and any shape capable of movement could function as an actuator. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any of the myriad of possible actuator shapes for the actuator shape of the patent's claims and still fall within the coverage of the patented claims.

#### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 12-15 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Hill (U.S. Patent 6,775,046).

6. Hill discloses forming two-way shape memory alloy films in which the film can be made while varying the alloy temperature during sputtering so that the deposited article has a compositional gradient (e.g. see column 4, lines 36-49; column 6, line 47 - column 7, line 35). Hill discloses that alloys of titanium and nickel can be used, but also discloses that other shape memory alloys such as gold-copper may be used (e.g. see column 2, lines 32-49). Regarding claims reciting and "actuator", the film of Hill has all the structural requirement to be an "actuator". Regarding claims reciting a three-dimensional shape, the shapes of Hill may be three-dimensional (e.g. see paragraph spanning columns 10 and 11).

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-16 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho (U.S. Publication No. 2002/0043456) in view of Hill (U.S. Patent 6,775,046) and further in view of Bement (U.S. Publication 2002/0114108).

9. Ho (different inventive entity and published more than one year prior to the filing date of this pending application) discloses forming two-way shape memory alloy films in which the film can be made while varying the target alloy temperature during sputtering so that the deposited article has a compositional gradient (e.g. see claims 1-2). Ho also discloses processing parameters (e.g. vacuum pressure, use of argon) for sputtering two-way shape memory alloy films (e.g. see paragraphs [0059]-[0060]; Tables I-V) and how they affect the final product. Ho discloses that different three-dimensional actuator shapes can be made (e.g. paragraph [0080]; Figure 33). Although Ho may not disclose all the possible shapes that an actuator may have, it would have been obvious to one of ordinary skill in the art at the time the invention was made that any actuator shape could be made by Ho's process. Regarding claims reciting a removable scaffold structure, the substrate upon which the film of Ho is sputtered qualifies as such a structure. Ho may differ from the pending claims in that Ho may not disclose that shape memory alloys other than titanium-nickel alloys can be used for his compositionally graded sputtered two-way shape memory films. Hill, however, discloses that it was known in the art at the time this application was filed that both titanium-nickel shape memory alloys and shape memory alloys of other compositions than titanium-nickel (e.g. gold-copper, column 2, lines 32-49) could be used in the manufacture of compositionally graded sputtered two-way shape memory films

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(e.g. see column 4, lines 13-49). In view of Hill, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use other conventionally used and known shape memory alloys for the actuators of Ho because Hill clearly shows that non-titanium-nickel alloys would work in Ho's process. Ho and Hill discloses various shape memory alloy compositions in the art, but do not specifically mention the claimed gold-cadmium, copper-zinc-aluminum and copper-nickel-aluminum compositions. Bement is cited simply to show that gold-cadmium, copper-zinc-aluminum and copper-nickel-aluminum shape memory alloy compositions are conventional shape memory alloy compositions in the art and also that it is well understood in the art that these alloys can be formed by sputtering processes (e.g. see paragraph [0026]). In view of Bement, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use gold-cadmium, copper-zinc-aluminum and copper-nickel-aluminum shape memory alloy compositions in Ho's process because Hill clearly shows that non-titanium-nickel alloys would work in Ho's process and Bement shows these shape memory alloy compositions are conventional in the art. In view of Ho's disclosure of the processing parameters involved in sputtering two-way shape memory alloy films, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the sputtering process parameters for best results for each particular chosen composition.

10. Claims 1-16 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho (Sputter Deposition of NiTi Thin Film Exhibiting the SME at Room Temperatures, Proceedings of the Symposium 1998 ASME International Mechanical Engineering Congress and

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Exposition, Nashville TN, November 14-19, 1999) in view of Hill (U.S. Patent 6,775,046) and further in view of Bement (U.S. Publication 2002/0114108).

11. Ho (different inventive entity and published more than one year prior to the filing date of this pending application) discloses forming two-way shape memory alloy films in which the film can be made while varying the target alloy temperature during sputtering so that the deposited article has a compositional gradient (e.g. see abstract). Ho also discloses processing parameters (e.g. vacuum pressure, use of argon) for sputtering two-way shape memory alloy films (e.g. see entire document and figures) and how they affect the final product. Ho discloses that different three-dimensional actuator shapes can be made (e.g. see Figure 14). Although Ho may not disclose all the possible shapes that an actuator may have, it would have been obvious to one of ordinary skill in the art at the time the invention was made that any actuator shape could be made by Ho's process. Regarding claims reciting a removable scaffold structure, the substrate upon which the film of Ho is sputtered qualifies as such a structure. Ho may differ from the pending claims in that Ho may not disclose that shape memory alloys other than titanium-nickel alloys can be used for his compositionally graded sputtered two-way shape memory films. Hill, however, discloses that it was known in the art at the time this application was filed that both titanium-nickel shape memory alloys and shape memory alloys of other compositions than titanium-nickel (e.g. gold-copper, column 2, lines 32-49) could be used in the manufacture of compositionally graded sputtered two-way shape memory films (e.g. see column 4, lines 13-49). In view of Hill, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use other conventionally used and known shape memory alloys for the



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actuators of Ho because Hill clearly shows that non-titanium-nickel alloys would work in Ho's process. Ho and Hill discloses various shape memory alloy compositions in the art, but do not specifically mention the claimed gold-cadmium, copper-zinc-aluminum and copper-nickel-aluminum compositions. Bement is cited simply to show that gold-cadmium, copper-zinc-aluminum and copper-nickel-aluminum shape memory alloy compositions are conventional shape memory alloy compositions in the art and also that it is well understood in the art that these alloys can be formed by sputtering processes (e.g. see paragraph [0026]). In view of Bement, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use gold-cadmium, copper-zinc-aluminum and copper-nickel-aluminum shape memory alloy compositions in Ho's process because Hill clearly shows that non-titanium-nickel alloys would work in Ho's process and Bement shows these shape memory alloy compositions are conventional in the art. In view of Ho's disclosure of the processing parameters involved in sputtering two-way shape memory alloy films, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the sputtering process parameters for best results for each particular chosen composition.

12. Claims 1-16 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho (Sputter Deposition of NiTi Thin Film Shape Memory Alloy Using a Heated Target, Thin Solid Films 370, July 17, 2000, pp. 18-29) in view of Hill (U.S. Patent 6,775,046) and further in view of Bement (U.S. Publication 2002/0114108).

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13. Ho (different inventive entity and published more than one year prior to the filing date of this pending application) discloses forming two-way shape memory alloy films in which the film can be made while varying the target alloy temperature during sputtering so that the deposited article has a compositional gradient (e.g. see abstract). Ho also discloses processing parameters (e.g. vacuum pressure, use of argon) for sputtering two-way shape memory alloy films (e.g. entire article) and how they affect the final product. Although Ho may not disclose all the possible shapes that the films may have, it would have been obvious to one of ordinary skill in the art at the time the invention was made that any functional shape memory configuration could be made by Ho's process. Regarding claims reciting a removable scaffold structure, the substrate upon which the film of Ho is sputtered qualifies as such a structure. Ho may differ from the pending claims in that Ho may not disclose that shape memory alloys other than titanium-nickel alloys can be used for his compositionally graded sputtered two-way shape memory films. Hill, however, discloses that it was known in the art at the time this application was filed that both titanium-nickel shape memory alloys and shape memory alloys of other compositions than titanium-nickel (e.g. gold-copper, column 2, lines 32-49) could be used in the manufacture of compositionally graded sputtered two-way shape memory films (e.g. see column 4, lines 13-49). In view of Hill, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use other conventionally used and known shape memory alloys for the actuators of Ho because Hill clearly shows that non-titanium-nickel alloys would work in Ho's process. Ho and Hill discloses various shape memory alloy compositions in the art, but do not specifically mention the claimed gold-cadmium, copper-zinc-aluminum and copper-nickel-aluminum compositions. Bement is cited simply to show that gold-cadmium, copper-zinc-

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aluminum and copper-nickel-aluminum shape memory alloy compositions are conventional shape memory alloy compositions in the art and also that it is well understood in the art that these alloys can be formed by sputtering processes (e.g. see paragraph [0026]). In view of Bement, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use gold-cadmium, copper-zinc-aluminum and copper-nickel-aluminum shape memory alloy compositions in Ho's process because Hill clearly shows that non-titanium-nickel alloys would work in Ho's process and Bement shows these shape memory alloy compositions are conventional in the art. In view of Ho's disclosure of the processing parameters involved in sputtering two-way shape memory alloy films, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the sputtering process parameters for best results for each particular chosen composition.

#### ***Allowable Subject Matter***

14. Claim 17 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record does not disclose an SME actuator of a porous foam of the claimed two-way shape memory effect and compositional gradient nor does the prior art provide motivation for making such a foam.

#### ***Conclusion***

15. Regarding the applicant's filing date, the pending claims in this continuation-in-part are afforded the date of the filing of this application only (January 11, 2003). The pending claims

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are not afforded the filing dates of the parent application SN 09/795,555 and its provisional application 06/185,841. Benefit of a parent priority date is not afforded to claims in a continuation-in-part application which contain matter which was not disclosed in the parent application. The parent application supported only titanium-nickel shape memory alloy materials and the pending claims in this application allow for shape memory alloy materials other than titanium-nickel shape memory alloys. Extension of the disclosure to support non-titanium containing alloys was first introduced at the filing of this continuation-in-part application. Therefore the pending claims in this application are not fully supported by the parent application (see the rejection under 35 USC 112, first paragraph, in the Office Action mailed July 30, 2003 in the parent) and can only be afforded only the filing date of this application. In view of the above, prior art references having effective dates prior to the filing date of this pending application have been applied in the rejection of the claims even though the references may not have effective dates prior to the filing of applicant's parent application. While the Ho (U.S. Publication No. 2002/0043456) reference may be part of the pending application's parentage, it was published more than one year prior to the filing of the pending application and thus qualifies as prior art to the material first introduced into this continuation-in-part application at the time of filing of this pending application. It is also noted that the applied Ho references have a different inventive entity than this pending application.

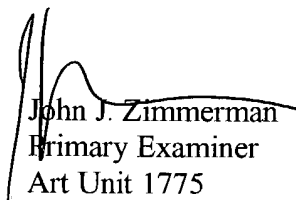
16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure but not impact on the patentability of the pending claims. Bonniau (U.S. Patent 5,641,955) is particularly relevant because this reference discusses the two-way memory effect in

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both titanium containing and non-titanium containing SMA alloys (e.g. column 3, lines 29-52) and also composition gradients (e.g. claim 6; column 5, lines 14-27). The composition gradient of Bonniau, however, is constructed by varying the composition along a helix of SMA wire and would not read on films, as required by the pending claims, nor would it be obvious from the disclosure of Bonniau to modify the gradient from helix form into films. The Quandt reference is particularly pertinent in that it produces a two-way shape memory effect, but it results in a different product than the gradient product of the pending claims.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John J. Zimmerman whose telephone number is (571) 272-1547. The examiner can normally be reached on 8:30am-5:00pm, M-F. Supervisor Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John J. Zimmerman  
Primary Examiner  
Art Unit 1775

jjz  
August 26, 2004